Performance of Duct Leakage Test Methods

When to Use Which and Why

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Why Worry About Duct Leakage?

- Wasted Energy
  - Leakage to outside
  - Supply leakage tends to be more serious, especially in heating
- IAQ
  - Leakage to inside or outside
  - Return leakage tends to be more serious
  - Supply leakage TO OUTSIDE acts as an exhaust fan

Why Test?

- Many buildings do not have problems
- Some buildings have major problems
- Ducts are often in places that are not fun to go if you don't have to

Test Methods

- There are many test methods for duct leakage
- Each evaluates something different
- Which to choose depends on what you are trying to determine, and why

Test Methods

- Pressure Pan
  - Identifies duct portions that are problematic
  - Does NOT provide a leakage number

Test Methods

- Pressure Pan
  - Like a zone pressure test for ducts
  - Depressurize the house using a blower door
  - Go around to each register and seal it, ONE AT A TIME
  - Measure pressure across the register
  - Big numbers are bad – indicates a leak to outside

Test Methods

- Duct Pressurization
  - Estimates airtightness of ducts (i.e. leakage area)
  - Can be used for leakage to outside only or total leakage
  - Can be used for separate supply and return leakage

Test Methods

- Duct Pressurization
  - Effectively a blower door test on the ducts
  - If the house, with a blower door, is pressurized to the same amount as the ducts are pressurized, the result is leakage to outside
  - If no blower door is used the result is total leakage
  - If a barrier is placed between the supply and return (e.g. at the filter slot) then you can estimate supply and return separately

Test Methods

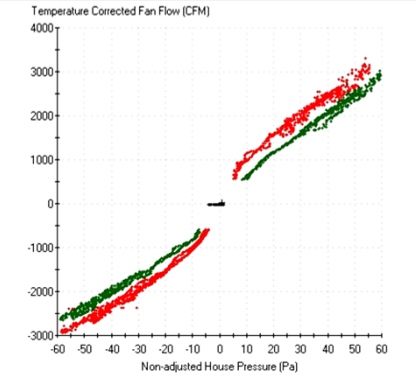
- Blower Door Subtraction
  - Requires two blower door tests, one with all registers sealed
  - Requires additional measurements to correct for leakage to inside
  - Does not evaluate supply from return separately

Test Methods

- Delta-Q test
  - Uses a blower door controlled by software
  - Estimates leakage at operating conditions
  - Evaluates supply and return separately
  - More sensitive to wind

Test Methods

- Delta-Q test
  - Run the blower door through a range of pressures
    - Depressurization and pressurization
    - Air handler off and air handler on
  - Computer use critical
  - Software applies calculation to results



Effect of Inaccessible Registers

- Pressure pan
  - Not ideal – may miss the biggest problem
  - Still can be valuable – may find the biggest problem, at least will indicate if there is a big problem
- Duct pressurization
  - Uncertainty becomes very large
- Blower door subtraction
  - Uncertainty becomes very large
- Delta-Q
  - Irrelevant – register access unnecessary

Duct Leakage Test Selection

- Depends on the question
  - Where in the system should we focus our efforts?
    - Pressure pan
  - Estimate site-specific energy savings potential and cost-effectiveness of duct sealing?
    - Duct pressurization (with the blower door running) or Delta-Q
  - Include consideration of IAQ/distribution?
    - Duct pressurization (without the blower door running)